**Vanadio-oxy-dravite**

\[ \text{NaV}_3(\text{Al}_4\text{Mg}_2)\text{Si}_8\text{O}_{18}(\text{BO}_3)_3(\text{OH})_3\text{O} \]

**Crystal Data:** Hexagonal. **Point Group:** 3m. As terminated prismatic crystals, to 0.3 mm.

**Physical Properties:** **Cleavage:** Poor/indistinct on \{0001\}. **Fracture:** Conchoidal. **Tenacity:** Brittle. **Hardness** = 7.5 **D(meas.)** = n.d. **D(calc.)** = 3.14

**Optical Properties:** Transparent. **Color:** Green. **Streak:** Pale green. **Luster:** Vitreous. **Optical Class:** Uniaxial (−). \(\omega = 1.693(5)\) \(\varepsilon = 1.673(5)\) **Pleochroism:** \(O = \text{yellow-green; E} = \text{pale olive green.}\)

**Cell Data:** **Space Group:** R3m. \(a = 16.0273(3)\) \(c = 7.2883(3)\) \(Z = 3\)

**X-ray Powder Pattern:** Calculated pattern.
2.5958 (100), 2.9928 (67), 4.0041 (66), 4.2606 (52), 3.5221 (47), 2.0573 (43), 6.4467 (37)

**Chemistry:**

\[
\begin{array}{ccc}
\text{SiO}_2 & 35.34 & \text{MgO} & 9.65 \\
\text{TiO}_2 & 0.29 & \text{CaO} & 1.24 \\
\text{B}_2\text{O}_3 & [10.23] & \text{Na}_2\text{O} & 2.11 \\
\text{Al}_2\text{O}_3 & 20.36 & \text{K}_2\text{O} & 0.09 \\
\text{Cr}_2\text{O}_3 & 1.48 & \text{H}_2\text{O} & [2.86] \\
\text{V}_2\text{O}_4 & 15.97 & \text{Total} & 100.12 \\
\text{Fe}_2\text{O}_3 & [0.34] & & \\
\text{FeO} & [0.15] & & \\
\end{array}
\]

(1) Pereval marble quarry, Sludyanka, Lake Baikal, Russia; average of 10 electron microprobe analyses supplemented by FTIR spectrometry, \(\text{B}_2\text{O}_3\) and \(\text{Fe}_2\text{O}_3\); \(\text{FeO}\) calculated; corresponds to \(X(\text{Na}_{0.70}\text{Ca}_{0.23}\square_{0.03}\text{K}_{0.02})_{Z=1}\); \(Y(V^{3+}_{1.39}\text{Mg}_{1.16}\text{Al}_{0.07})_{Z=1}\); \(T(\text{Fe}^{3+}_{0.05})_{Z=1}\); \(\text{Si}_{0.70}\text{O}_{1.8}\); \(\text{BO}_3\); \(\text{OH}\); \(\square\text{Fe}^{3+}_{0.05}\text{Fe}^{2+}_{0.05}\); \(\square\text{Fe}^{3+}_{0.05}\text{Fe}^{2+}_{0.05}\); \(\square\text{Fe}^{3+}_{0.05}\text{Fe}^{2+}_{0.05}\);

**Polymorphism & Series:** Complete solid-solution exists between the species oxy-dravite, vanadio-oxy-dravite, and oxy-vanadium-dravite.

**Mineral Group:** Tourmaline supergroup, alkali group, oxy-subgroup 3.

**Occurrence:** A primary mineral in metagranulite (granulite facies) in marble.

**Association:** Quartz, Cr-V-bearing tremolite and mica, diopside-kosmochlor-natalyite, Cr-bearing goldmanite, esquelite-karelianite, dravite–oxy-vanadium-dravite, V-bearing titanite and rutile, ilmenite, oxyvanite-berdesinskiite, shreyerite, plagioclase, scapolite, zircon, pyrite.

**Distribution:** From the Pereval marble quarry, Sludyanka, Lake Baikal, Russia.

**Name:** As an oxy-dravite with dominant vanadium in the Y site and \(V^{3+}\) contents between 5 and 1.5 atoms per formula unit.

**Type Material:** Museum of Mineralogy, Earth Sciences Department, Sapienza University, Rome, Italy (33068).

**References:** (1) Bosi, F., H. Skogby, L. Reznitskii, and U. Hålenius (2014) Vanadio-oxy-dravite, \(\text{NaV}_3(\text{Al}_4\text{Mg}_2)\text{Si}_8\text{O}_{18}(\text{BO}_3)_3(\text{OH})_3\text{O}\), a new mineral species of the tourmaline supergroup. Amer. Mineral., 99, 218-224.